

REMARKS

In the final Office Action dated December 20, 2007, it is noted that claims 19 – 42 are pending; that the drawings are objected to; and that claims 19 – 42 stand rejected under 35 U.S.C. § 103.

Independent claims 19, 37 – 39 and dependent claim 32 have been amended herein. No new matter is entered.

Objection to the Drawings

The drawings are objected to because the drawing must show every feature of the invention specified in the claims. In the attached Replacement Drawing Sheet, Fig. 1 now shows the reflective outcoupling material having an angular width that varies along a length of the rod. No new matter has been added. Applicants respectfully request that the objection to the drawings be withdrawn.

Rejections under 35 U.S.C. § 103(a)

Claims 19 – 30, 37 and 38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Masutani et al. (U.S. Pat. 6,488,397) in view of Hassler, Jr. (U.S. Pat. 4,954,931).

Claims 31 – 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Masutani et al. in view of Hassler, Jr.

Claim 34 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Masutani et al. in view of Hassler, Jr., as applied to claim 19 above, further in view of Ashall (U.S. Pat. 5,390,456).

Claims 35 and 36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Masutani et al. in view of Hassler, Jr., as applied to claim 19 above, further in view of Reid (U.S. Pat. 6,267,492).

Claims 39 – 42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Masutani et al. in view of Yokoyama (U.S. Pat. 5,134,549).

Arguments

Applicant respectfully submits that claims 19 – 42 contain features that are not found in any of the cited references.

For example, claim 19 requires:

“an angular width of the reflective outcoupling material affixed to the outer surface of the rod controls an angular distribution of light leaving the side of the rod.”

In the Final Office Action, page 4, it is alleged that Masutani et al., column 2, lines 16 - 22, discloses the above claimed features. However, Applicants respectfully submit that the cited passage does not teach or suggest the claimed feature. In the reference there is no suggestion that the angular distribution of light leaving the side of the rod can be controlled by the angular width of the reflective outcoupling material.

Masutani et al., column 2, lines 16 – 22, recites:

“The linear illuminant system of this invention has the strip-shaped reflecting layer formed along the length of the light transmission cylinder to reflect light passing through the light transmission cylinder. Reflected light forms linear light with **high directivity** and luminance to emerge from the side surface area opposite to the reflecting layer. Consequently, strong side luminance with sufficient brightness is obtained.”
[Emphasis added]

Therefore, Masutani et al., discloses that the reflected light forms linear light with **high directivity**. A highly directive light must be a very narrow angular distribution of light. However, nothing in Masutani et al. teaches or suggest that that the angular distribution of light leaving the side of the rod can be controlled by the angular width of the reflective outcoupling material. Yet, having a wide angular distribution of light would defeat the **high directivity** feature in Masutani et al. This clearly shows that Masutani et al. does not teach that *“an angular width of the reflective outcoupling material affixed to the outer surface of the rod controls an angular distribution of light leaving the side of the rod,”* as claimed.

Moreover, contrary to the assertion made in the final Office Action, page 6, that the claimed feature *“an angular width of the reflective outcoupling material affixed to the outer*

surface of the rod controls an angular distribution of light leaving the side of the rod' is inherent. Applicants respectfully submit that this feature is not inherent. This is because, as disclosed in Applicants' specification, page 5, line 18 through page 6, line 1, the angular distribution of light can depend on the cross-sectional shape of the rod. Furthermore, in some cross-sectional shapes, the angular distribution of light may not depend on the angular width of the reflective material at all. Therefore, it is not necessary or inherent that the angular width of the reflective outcoupling material controls the angular distribution of light.

Therefore, for at least the above reasons, Applicants submit that Masutani et al. does not disclose the claimed features "*an angular width of the reflective outcoupling material affixed to the outer surface of the rod controls an angular distribution of light leaving the side of the rod*" as proposed in the final Office Action. Applicants further submit that the claimed features are not taught or inherent in any of the cited references, Hassler, Jr., Ashall, Reid, and Yokoyama. For example, Ashall shows paint dots that transmit light rather than reflect light, and there is no discussion on the angular distribution of light controlled by the angular width of the reflective outcoupling material. Similarly, Yokoyama shows merely transmissive outcoupling material which operates by diffusion, but does not disclose that the angular distribution of light controlled by the angular width of the reflective outcoupling material. Therefore, claim 19 is patentable over Masutani et al., Hassler, Jr., Ashall, Reid, and Yokoyama, alone or in combination.

In addition, Applicants traverse the 103(a) rejection based on the combined teachings of Masutani et al. and Hassler, Jr.

Applicants' claims 32, 37 – 39 also recites:

"the angular width of the reflective outcoupling material varies along a length of the rod to provide substantially uniform light distribution."

In the Office Action, page 5, it is conceded by the Office that Masutani et al. does not disclose that the outcoupling material being distributed along an angular width in such a way as to ensure uniform light distribution along the length of the rod. Because of this deficiency in Masutani et al., the Office cited Hassler, Jr., which discloses a prism with a window on the surface of the prism and the window has a shape which tapers toward the light emitting diodes. In the Office Action, page 16, it is also conceded by the Office that the outcoupling means in

Hassler, Jr. is different from the outcoupling means in Masutani et al. or in the claimed invention. Because the window in Hassler, Jr. transmits light as opposed to reflects light, so Hassler, Jr. teaches away from using a reflective coating as in the present invention, and therefore, a person skilled in the art would not look to the transmissive window etched into Hassler, Jr. to adjust the angular width of the uniform reflective coating in Masutani et al.

However, the Office alleges that varying the width of the reflective outcoupling material of Masutani et al. would have flown naturally to one ordinarily skilled in the art in light of Hassler, Jr. to achieve uniform light distribution along the rod. Applicants respectfully disagree with such assertion.

Applicants submit that Hassler, Jr. teaches a tapered shape window on a flat planer front surface of a prism, and that Masutani et al. teaches a reflective layer on the back of a curved surface. Since the geometry and topology of a flat surface are different from that of a curved surface, it is not apparent that a shape on a flat surface would look the same on a curved surface. For example, a rectangle on a flat surface can look like a pincushion on a curved surface. Hence, there is no obvious match or correspondence between one shape on a flat surface and another shape on a curved surface.

Furthermore, the light outcoupling in Hassler, Jr. is by way of diffusion, i.e. the light is scattered at the front frosted surface, yet in Masutani et al., the light is reflected at the back surface and then refracted at the front surface. Because of the diffusion mechanism, light scatters out in a wide range of angular distribution, but in reflection and refraction, light travels in a determined direction according to the laws of reflection and refraction. There is no reasonable expectation or suggestion that the light scattered at the front would have similar distribution as that reflected at the back and refracted at the front. Thus, a tapered window on a flat surface, which transmits uniform light along the length, does not suggest that a similar uniform light distribution will result from a varying angular width reflective layer on a curved surface. Therefore, Applicants submit that the combined teachings of Masutani et al. and Hassler, Jr. would not have suggested to those of ordinary skill in the art the claimed feature. This is because with the big differences in geometry, topology, and outcoupling means between Masutani et al. and Hassler, Jr., the tapered window on a flat planer front surface of a prism

would not suggest or motivate a person ordinarily skilled in the art to adjust the angular width of the reflective layer on the back curved surface of the rod in order to get uniform light distribution along the length of the rod.

For at least the above further reasons, Applicants submit that claim 19 is patentable because the claimed features “*the angular width of the reflective outcoupling material varies along a length of the rod to provide substantially uniform light distribution*” is not taught by Masutani et al. and Hassler, Jr., alone or in combination.

In addition, independent claims 37 – 39 include several similar distinguishing features as discussed above with respect to claim 19. Applicant essentially repeats the above arguments for claim 19 and applies them to claims 37 – 39 pointing out why claims 37 – 39 are patentable over Masutani et al., Hassler, Jr., Ashall, Reid, and Yokoyama, alone or in combination.

Claims 20 – 36 and 40 – 42 are also believed to be patentable, because they depend from independent claims 19 and 39, respectively, with each dependent claim containing further distinguishing features.

For example, claims 31 – 33 further require different cross-sectional shapes for the rod. None of the cited references teach or suggest these different shapes. Furthermore, Applicants submit that these shapes are critical to some aspect of the present system, and are not merely design choices. This is because, according to the laws of refraction, when light leaves the surface of the rod, the angle of light leaving the surface depends on the angle of incident, which depends on the shape of the rod. As disclosed in Applicants’ specification, page 5, line 18 through page 6, line 1, the angular distribution of light can depend on the cross-sectional shape of the rod. Therefore, the cross-sectional shape of the rod is a critical feature where a desired angular distribution of light is required in some embodiments of the present invention.

Conclusion

In view of the foregoing remarks it is respectfully submitted that the application is in condition of allowance. Any fee due with this paper, not already paid through an EFS-Web

filing, may be charged to Deposit Account No. 50-3894. Any overpayment may be credited to Deposit Account No. 50-3894.

Respectfully submitted,

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